checked by TT
3/3/2016

MEMORANDUM

TO: Mr. Addison Rice
Anderson, Mulholland and Associates

DATE: February 27, 2016

FROM: R. Infante

FILE: 1602064B

RE: Data Validation
Air samples
SDG: 1602064B

SUMMARY

Full validation was performed on the data for several gas samples analyzed for volatile organic compounds (full suite) by method Compendium Method TO-15: Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999. The samples were collected at the Bristol Myer Squib, Humacao, PR site on January 31, 2016 and submitted to Eurofins Air Toxics, Inc. of Folson, California that analyzed and reported the results under delivery groups (SDG) 1602064B.

The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: Compendium Method TO-15. Determination Of Volatile Organic Compounds (VOCas) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999; Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

In general the data is valid as reported and may be used for decision making purposes. The data results are acceptable for use. Result for 1,2,4-trichlorobenzene was qualified as estimated (J) in sample 1602064B-11A due to continuing calibration check outside method performance limit.

SAMPLES

The samples included in the review are listed below

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
B30-1SSV013116	1602064B-11A	01/31/2016	Air	VOCs
B30-2SSV013116	1602064B-12A	01/31/2016	Air	VOCs
B30-3SSV013116	1602064B-13A	01/31/2016	Air	VOCs
B30-4DSSV013116	1602064B-14A	01/31/2016	Air	VOCs
B30-5SSV013116	1602064B-15A	01/31/2016	Air	VOCs

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
B42-1SSV013116	1602064B-16A	01/31/2016	Air	VOCs
B42-2SSV013116	1602064B-17A	01/31/2016	Air	VOCs
B42-3SSV013116	1602064B-18A	01/31/2016	Air	VOCs
B3042AA013016	1602064B-10A	01/31/2016	Air	VOCs

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Canister cleaning certification criteria
- Surrogate spike recovery
- Internal standard performance and retention times
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody form.

Holding Times and Sample Preservation

Sample preservation was acceptable.

Samples analyzed within method recommended holding time.

GC/MS Tunes

The frequency and abundance of bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within the tuning criteria associated with the method.

Initial and Continuing Calibrations

VOCs – (Method TO-15)
Initial calibration meets method performance criteria. Ongoing accuracy of the instrument was determined by the analysis of a continuing calibration standard, continuing calibration meet the method performance criteria except for the following analytes:

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibration met the method performance criteria except for the following:				
02/15/2016	1602064B-20B	33 %	1,2,4-Trichlorobenzene	1602064B-11A

Results qualified estimated (J) in affected samples.

Method Blank/Trip Blank/Field Blank

Target analytes were not detected in laboratory method blanks above the reporting concentration/action level.

Summa canister met cleaning certification criteria.

No trip/field blank analyzed with this data package.

Surrogate Spike Recovery

The surrogate recoveries as per method TO-15 were within the laboratory QC acceptance limits in all samples analyzed.

Internal Standard Performance

VOCs -
Samples were spiked with the method specified internal standard. Internal standard are performance and retention times met the QC acceptance criteria in all sample analyses and calibration standards.

Laboratory/Field Duplicate Results

Laboratory duplicates (LCS/LCSD) were analyzed as part of this data set. Target analytes meet the RPD performance criteria of + 25 % for analytes 5 x SQL. No field duplicate collected with this data package. Field duplicate for the project included in data package SDG 1602024A.

LCS/LCSD Results

LCS/LCSD (blank spike) analyzed by the laboratory associated with this data package; % recoveries and RPD within laboratory and generally acceptable control limits.

Quantitation Limits and Sample Results

Dilutions were performed on TO-15 samples due to analytes concentration over the calibration range (see worksheet).

Calculations were spot checked.

Certification

The following samples 1602064B-11A; 1602064B-12A; 1602064B-13A; 1602064B-14A; 1602064B-15A; 1602064B-16A; 1602064B-17A; and 1602064B-18A were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document. The results are valid some of the results were qualified.

Rafael Infante
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Client Sample ID: B30-1SSV013116

Lab ID#: 1602064B-11A

EPA METHOD TO-15 GC/MS

File Name:	**14021509**	**Date of Collection:**	**1/31/16 12:24:00 PM**
Dil. Factor:	**796**	**Date of Analysis:**	**2/15/16 02:32 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4000	Not Detected	20000	Not Detected
Freon 114	4000	Not Detected	28000	Not Detected
Chloromethane	16000	Not Detected	33000	Not Detected
Vinyl Chloride	4000	Not Detected	10000	Not Detected
1,3-Butadiene	4000	Not Detected	8800	Not Detected
Bromomethane	4000	Not Detected	15000	Not Detected
Chloroethane	16000	Not Detected	42000	Not Detected
Freon 11	4000	Not Detected	22000	Not Detected
Ethanol	16000	Not Detected	30000	Not Detected
Freon 113	4000	Not Detected	30000	Not Detected
1,1-Dichloroethene	4000	Not Detected	16000	Not Detected
Acetone	16000	Not Detected	38000	Not Detected
2-Propanol	16000	Not Detected	39000	Not Detected
Carbon Disulfide	4000	Not Detected	12000	Not Detected
3-Chloropropene	16000	Not Detected	50000	Not Detected
Methylene Chloride	4000	Not Detected	14000	Not Detected
Methyl tert-butyl ether	4000	Not Detected	14000	Not Detected
trans-1,2-Dichloroethene	4000	Not Detected	16000	Not Detected
Hexane	4000	Not Detected	14000	Not Detected
1,1-Dichloroethane	4000	Not Detected	16000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	16000	Not Detected	47000	Not Detected
cis-1,2-Dichloroethene	4000	Not Detected	16000	Not Detected
Tetrahydrofuran	4000	Not Detected	12000	Not Detected
Chloroform	4000	Not Detected	19000	Not Detected
1,1,1-Trichloroethane	4000	Not Detected	22000	Not Detected
Cyclohexane	4000	820 J	14000	2800 J
Carbon Tetrachloride	4000	Not Detected	25000	Not Detected
2,2,4-Trimethylpentane	4000	Not Detected	18000	Not Detected
Benzene	4000	Not Detected	13000	Not Detected
1,2-Dichloroethane	4000	Not Detected	16000	Not Detected
Heptane	4000	Not Detected	16000	Not Detected
Trichloroethene	4000	Not Detected	21000	Not Detected
1,2-Dichloropropane	4000	Not Detected	18000	Not Detected
1,4-Dioxane	16000	Not Detected	57000	Not Detected
Bromodichloromethane	4000	Not Detected	27000	Not Detected
cis-1,3-Dichloropropene	4000	Not Detected	18000	Not Detected
4-Methyl-2-pentanone	4000	Not Detected	16000	Not Detected
Toluene	4000	Not Detected	15000	Not Detected
trans-1,3-Dichloropropene	4000	Not Detected	18000	Not Detected
1,1,2-Trichloroethane	4000	Not Detected	22000	Not Detected
Tetrachloroethene	4000	Not Detected	27000	Not Detected
2-Hexanone	16000	Not Detected	65000	Not Detected

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Client Sample ID: B30-1SSV013116

Lab ID#: 1602064B-11A

EPA METHOD TO-15 GC/MS

File Name:	**14021509**	**Date of Collection:**	**1/31/16 12:24:00 PM**
Dil. Factor:	**796**	**Date of Analysis:**	**2/15/16 02:32 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	4000	Not Detected	34000	Not Detected
1,2-Dibromoethane (EDB)	4000	Not Detected	30000	Not Detected
Chlorobenzene	4000	Not Detected	18000	Not Detected
Ethyl Benzene	4000	14000	17000	61000
m,p-Xylene	4000	440000	17000	1900000
o-Xylene	4000	8400	17000	36000
Styrene	4000	Not Detected	17000	Not Detected
Bromoform	4000	Not Detected	41000	Not Detected
Cumene	4000	Not Detected	20000	Not Detected
1,1,2,2-Tetrachloroethane	4000	Not Detected	27000	Not Detected
Propylbenzene	4000	Not Detected	20000	Not Detected
4-Ethyltoluene	4000	Not Detected	20000	Not Detected
1,3,5-Trimethylbenzene	4000	Not Detected	20000	Not Detected
1,2,4-Trimethylbenzene	4000	Not Detected	20000	Not Detected
1,3-Dichlorobenzene	4000	Not Detected	24000	Not Detected
1,4-Dichlorobenzene	4000	Not Detected	24000	Not Detected
alpha-Chlorotoluene	4000	Not Detected	21000	Not Detected
1,2-Dichlorobenzene	4000	Not Detected	24000	Not Detected
1,2,4-Trichlorobenzene	16000	Not Detected UJ J	120000	Not Detected UJ
Hexachlorobutadiene	16000	Not Detected	170000	Not Detected
Naphthalene	16000	Not Detected	83000	Not Detected

J = Estimated value.
UJ = Analyte associated with low bias in the CCV and/or LCS.
Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: B30-2SSV013116

Lab ID#: 1602064B-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p020818	**Date of Collection:**	1/31/16 12:40:00 PM
Dil. Factor:	2.32	**Date of Analysis:**	2/8/16 07:43 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.48 J	5.7	2.4 J
Freon 114	1.2	Not Detected	8.1	Not Detected
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	12	Not Detected	45	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.2	0.24 J	6.5	1.4 J
Ethanol	4.6	7.3	8.7	14
Freon 113	1.2	Not Detected	8.9	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	8.2 J	28	20 J
2-Propanol	4.6	9.2	11	23
Carbon Disulfide	4.6	Not Detected	14	Not Detected
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	40	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	1.6 J	14	4.6 J
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.4	Not Detected
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Cyclohexane	1.2	Not Detected	4.0	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.3	Not Detected
2,2,4-Trimethylpentane	1.2	0.17 J	5.4	0.79 J
Benzene	1.2	Not Detected	3.7	Not Detected
1,2-Dichloroethane	1.2	Not Detected	4.7	Not Detected
Heptane	1.2	0.67 J	4.8	2.8 J
Trichloroethene	1.2	Not Detected	6.2	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.4	Not Detected
1,4-Dioxane	4.6	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.8	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.8	Not Detected
Toluene	1.2	0.24 J	4.4	0.[illegible]
trans-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Tetrachloroethene	1.2	Not Detected	7.9	Not Detected
2-Hexanone	4.6	Not Detected	19	Not Detected

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Client Sample ID: B30-2SSV013116

Lab ID#: 1602064B-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020818**	**Date of Collection:**	**1/31/16 12:40:00 PM**
Dil. Factor:	**2.32**	**Date of Analysis:**	**2/8/16 07:43 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	9.9	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	8.9	Not Detected
Chlorobenzene	1.2	Not Detected	5.3	Not Detected
Ethyl Benzene	1.2	Not Detected	5.0	Not Detected
m,p-Xylene	1.2	Not Detected	5.0	Not Detected
o-Xylene	1.2	Not Detected	5.0	Not Detected
Styrene	1.2	Not Detected	4.9	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.7	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.0	Not Detected
Propylbenzene	1.2	Not Detected	5.7	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.7	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.0	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,2,4-Trichlorobenzene	4.6	Not Detected	34	Not Detected
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected
Naphthalene	2.3	Not Detected	12	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: B30-3SSV013116

Lab ID#: 1602064B-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020817**	**Date of Collection:**	**1/31/16 1:00:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**2/8/16 07:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	0.62 J	6.2	3.1 J
Freon 114	1.2	Not Detected	8.8	Not Detected
Chloromethane	12	Not Detected	26	Not Detected
Vinyl Chloride	1.2	Not Detected	3.2	Not Detected
1,3-Butadiene	1.2	Not Detected	2.8	Not Detected
Bromomethane	12	Not Detected	49	Not Detected
Chloroethane	5.0	Not Detected	13	Not Detected
Freon 11	1.2	0.28 J	7.0	1.6 J
Ethanol	5.0	8.8	9.4	16
Freon 113	1.2	Not Detected	9.6	Not Detected
1,1-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Acetone	12	7.7 J	30	18 J
2-Propanol	5.0	9.8	12	24
Carbon Disulfide	5.0	Not Detected	16	Not Detected
3-Chloropropene	5.0	Not Detected	16	Not Detected
Methylene Chloride	12	Not Detected	44	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.5	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Hexane	1.2	Not Detected	4.4	Not Detected
1,1-Dichloroethane	1.2	Not Detected	5.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.7	Not Detected
Chloroform	1.2	Not Detected	6.1	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.8	Not Detected
Cyclohexane	1.2	Not Detected	4.3	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.9	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.9	Not Detected
Benzene	1.2	Not Detected	4.0	Not Detected
1,2-Dichloroethane	1.2	Not Detected	5.1	Not Detected
Heptane	1.2	0.72 J	5.1	3.0 J
Trichloroethene	1.2	Not Detected	6.7	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.8	Not Detected
1,4-Dioxane	5.0	Not Detected	18	Not Detected
Bromodichloromethane	1.2	Not Detected	8.4	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.7	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	5.1	Not Detected
Toluene	1.2	0.24 J	4.7	0.91 J
trans-1,3-Dichloropropene	1.2	Not Detected	5.7	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.8	Not Detected
Tetrachloroethene	1.2	Not Detected	8.5	Not Detected
2-Hexanone	5.0	Not Detected	20	Not Detected

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Client Sample ID: B30-3SSV013116

Lab ID#: 1602064B-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020817**	**Date of Collection:**	**1/31/16 1:00:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**2/8/16 07:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	11	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.6	Not Detected
Chlorobenzene	1.2	Not Detected	5.8	Not Detected
Ethyl Benzene	1.2	Not Detected	5.4	Not Detected
m,p-Xylene	1.2	Not Detected	5.4	Not Detected
o-Xylene	1.2	Not Detected	5.4	Not Detected
Styrene	1.2	Not Detected	5.3	Not Detected
Bromoform	1.2	Not Detected	13	Not Detected
Cumene	1.2	Not Detected	6.2	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.6	Not Detected
Propylbenzene	1.2	Not Detected	6.2	Not Detected
4-Ethyltoluene	1.2	Not Detected	6.2	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	6.2	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	6.2	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.5	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
1,2,4-Trichlorobenzene	5.0	Not Detected	37	Not Detected
Hexachlorobutadiene	5.0	Not Detected	54	Not Detected
Naphthalene	2.5	Not Detected	13	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: B30-4DSSV013116

Lab ID#: 1602064B-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p020814	**Date of Collection:**	1/31/16 1:20:00 PM
Dil. Factor:	17.0	**Date of Analysis:**	2/8/16 05:18 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	8.5	Not Detected	42	Not Detected
Freon 114	8.5	Not Detected	59	Not Detected
Chloromethane	85	Not Detected	180	Not Detected
Vinyl Chloride	8.5	Not Detected	22	Not Detected
1,3-Butadiene	8.5	Not Detected	19	Not Detected
Bromomethane	85	Not Detected	330	Not Detected
Chloroethane	34	Not Detected	90	Not Detected
Freon 11	8.5	Not Detected	48	Not Detected
Ethanol	34	1600	64	3000
Freon 113	8.5	Not Detected	65	Not Detected
1,1-Dichloroethene	8.5	Not Detected	34	Not Detected
Acetone	85	47 J	200	110 J
2-Propanol	34	1500	84	3600
Carbon Disulfide	34	Not Detected	100	Not Detected
3-Chloropropene	34	Not Detected	110	Not Detected
Methylene Chloride	85	Not Detected	300	Not Detected
Methyl tert-butyl ether	8.5	Not Detected	31	Not Detected
trans-1,2-Dichloroethene	8.5	Not Detected	34	Not Detected
Hexane	8.5	Not Detected	30	Not Detected
1,1-Dichloroethane	8.5	Not Detected	34	Not Detected
2-Butanone (Methyl Ethyl Ketone)	34	17 J	100	51 J
cis-1,2-Dichloroethene	8.5	Not Detected	34	Not Detected
Tetrahydrofuran	8.5	Not Detected	25	Not Detected
Chloroform	8.5	Not Detected	42	Not Detected
1,1,1-Trichloroethane	8.5	Not Detected	46	Not Detected
Cyclohexane	8.5	Not Detected	29	Not Detected
Carbon Tetrachloride	8.5	Not Detected	53	Not Detected
2,2,4-Trimethylpentane	8.5	1.9 J	40	8.9 J
Benzene	8.5	Not Detected	27	Not Detected
1,2-Dichloroethane	8.5	Not Detected	34	Not Detected
Heptane	8.5	Not Detected	35	Not Detected
Trichloroethene	8.5	Not Detected	46	Not Detected
1,2-Dichloropropane	8.5	Not Detected	39	Not Detected
1,4-Dioxane	34	Not Detected	120	Not Detected
Bromodichloromethane	8.5	Not Detected	57	Not Detected
cis-1,3-Dichloropropene	8.5	Not Detected	38	Not Detected
4-Methyl-2-pentanone	8.5	Not Detected	35	Not Detected
Toluene	8.5	8.0 J	32	30 J
trans-1,3-Dichloropropene	8.5	Not Detected	[illegible]	Not Detected
1,1,2-Trichloroethane	8.5	Not Detected	[illegible]	Not Detected
Tetrachloroethene	8.5	Not Detected	[illegible]	Not Detected
2-Hexanone	34	Not Detected	[illegible]	Not Detected

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Client Sample ID: B30-4DSSV013116

Lab ID#: 1602064B-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020814**	**Date of Collection:**	**1/31/16 1:20:00 PM**
Dil. Factor:	**17.0**	**Date of Analysis:**	**2/8/16 05:18 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	8.5	Not Detected	72	Not Detected
1,2-Dibromoethane (EDB)	8.5	Not Detected	65	Not Detected
Chlorobenzene	8.5	Not Detected	39	Not Detected
Ethyl Benzene	8.5	3.8 J	37	16 J
m,p-Xylene	8.5	11	37	47
o-Xylene	8.5	4.9 J	37	21 J
Styrene	8.5	1.4 J	36	6.2 J
Bromoform	8.5	Not Detected	88	Not Detected
Cumene	8.5	Not Detected	42	Not Detected
1,1,2,2-Tetrachloroethane	8.5	Not Detected	58	Not Detected
Propylbenzene	8.5	Not Detected	42	Not Detected
4-Ethyltoluene	8.5	2.1 J	42	10 J
1,3,5-Trimethylbenzene	8.5	Not Detected	42	Not Detected
1,2,4-Trimethylbenzene	8.5	Not Detected	42	Not Detected
1,3-Dichlorobenzene	8.5	8.0 J	51	48 J
1,4-Dichlorobenzene	8.5	Not Detected	51	Not Detected
alpha-Chlorotoluene	8.5	Not Detected	44	Not Detected
1,2-Dichlorobenzene	8.5	Not Detected	51	Not Detected
1,2,4-Trichlorobenzene	34	Not Detected	250	Not Detected
Hexachlorobutadiene	34	Not Detected	360	Not Detected
Naphthalene	17	Not Detected	89	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: B30-5SSV013116

Lab ID#: 1602064B-15A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020813**	**Date of Collection:**	**1/31/16 1:49:00 PM**
Dil. Factor:	**2.15**	**Date of Analysis:**	**2/8/16 04:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.58 J	5.3	2.8 J
Freon 114	1.1	Not Detected	7.5	Not Detected
Chloromethane	11	Not Detected	22	Not Detected
Vinyl Chloride	1.1	Not Detected	2.7	Not Detected
1,3-Butadiene	1.1	Not Detected	2.4	Not Detected
Bromomethane	11	Not Detected	42	Not Detected
Chloroethane	4.3	Not Detected	11	Not Detected
Freon 11	1.1	0.25 J	6.0	1.4 J
Ethanol	4.3	25	8.1	48
Freon 113	1.1	Not Detected	8.2	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Acetone	11	7.4 J	26	18 J
2-Propanol	4.3	25	10	61
Carbon Disulfide	4.3	0.86 J	13	2.7 J
3-Chloropropene	4.3	Not Detected	13	Not Detected
Methylene Chloride	11	Not Detected	37	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	3.9	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Hexane	1.1	Not Detected	3.8	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.3	1.3 J	13	3.8 J
cis-1,2-Dichloroethene	1.1	Not Detected	4.3	Not Detected
Tetrahydrofuran	1.1	Not Detected	3.2	Not Detected
Chloroform	1.1	Not Detected	5.2	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	5.9	Not Detected
Cyclohexane	1.1	0.50 J	3.7	1.7 J
Carbon Tetrachloride	1.1	Not Detected	6.8	Not Detected
2,2,4-Trimethylpentane	1.1	0.22 J	5.0	1.0 J
Benzene	1.1	Not Detected	3.4	Not Detected
1,2-Dichloroethane	1.1	Not Detected	4.4	Not Detected
Heptane	1.1	0.68 J	4.4	2.8 J
Trichloroethene	1.1	Not Detected	5.8	Not Detected
1,2-Dichloropropane	1.1	Not Detected	5.0	Not Detected
1,4-Dioxane	4.3	0.84 J	15	3.0 J
Bromodichloromethane	1.1	Not Detected	7.2	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	4.9	Not Detected
4-Methyl-2-pentanone	1.1	Not Detected	4.4	Not Detected
Toluene	1.1	0.90 J	4.0	3.4 J
trans-1,3-Dichloropropene	1.1	Not Detected	4.9	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	5.9	Not Detected
Tetrachloroethene	1.1	Not Detected	7.3	Not Detected
2-Hexanone	4.3	Not Detected	18	Not Detected

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Client Sample ID: B30-5SSV013116

Lab ID#: 1602064B-15A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020813**	**Date of Collection:**	**1/31/16 1:49:00 PM**
Dil. Factor:	**2.15**	**Date of Analysis:**	**2/8/16 04:54 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.1	Not Detected	9.2	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.3	Not Detected
Chlorobenzene	1.1	Not Detected	4.9	Not Detected
Ethyl Benzene	1.1	Not Detected	4.7	Not Detected
m,p-Xylene	1.1	0.33 J	4.7	1.4 J
o-Xylene	1.1	Not Detected	4.7	Not Detected
Styrene	1.1	Not Detected	4.6	Not Detected
Bromoform	1.1	Not Detected	11	Not Detected
Cumene	1.1	Not Detected	5.3	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.4	Not Detected
Propylbenzene	1.1	Not Detected	5.3	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.3	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.3	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.3	Not Detected
1,3-Dichlorobenzene	1.1	Not Detected	6.5	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.5	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.6	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.5	Not Detected
1,2,4-Trichlorobenzene	4.3	Not Detected	32	Not Detected
Hexachlorobutadiene	4.3	Not Detected	46	Not Detected
Naphthalene	2.2	Not Detected	11	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: B42-1SSV013116

Lab ID#: 1602064B-16A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020812**	**Date of Collection:**	**1/31/16 4:40:00 PM**
Dil. Factor:	**9.48**	**Date of Analysis:**	**2/8/16 04:28 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4.7	Not Detected	23	Not Detected
Freon 114	4.7	Not Detected	33	Not Detected
Chloromethane	47	Not Detected	98	Not Detected
Vinyl Chloride	4.7	Not Detected	12	Not Detected
1,3-Butadiene	4.7	Not Detected	10	Not Detected
Bromomethane	47	Not Detected	180	Not Detected
Chloroethane	19	Not Detected	50	Not Detected
Freon 11	4.7	Not Detected	27	Not Detected
Ethanol	19	680	36	1300
Freon 113	4.7	Not Detected	36	Not Detected
1,1-Dichloroethene	4.7	Not Detected	19	Not Detected
Acetone	47	35 J	110	84 J
2-Propanol	19	960	46	2400
Carbon Disulfide	19	Not Detected	59	Not Detected
3-Chloropropene	19	Not Detected	59	Not Detected
Methylene Chloride	47	Not Detected	160	Not Detected
Methyl tert-butyl ether	4.7	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	4.7	Not Detected	19	Not Detected
Hexane	4.7	Not Detected	17	Not Detected
1,1-Dichloroethane	4.7	Not Detected	19	Not Detected
2-Butanone (Methyl Ethyl Ketone)	19	11 J	56	33 J
cis-1,2-Dichloroethene	4.7	Not Detected	19	Not Detected
Tetrahydrofuran	4.7	Not Detected	14	Not Detected
Chloroform	4.7	Not Detected	23	Not Detected
1,1,1-Trichloroethane	4.7	Not Detected	26	Not Detected
Cyclohexane	4.7	Not Detected	16	Not Detected
Carbon Tetrachloride	4.7	Not Detected	30	Not Detected
2,2,4-Trimethylpentane	4.7	1.1 J	22	5.1 J
Benzene	4.7	1.9 J	15	6.0 J
1,2-Dichloroethane	4.7	Not Detected	19	Not Detected
Heptane	4.7	Not Detected	19	Not Detected
Trichloroethene	4.7	Not Detected	25	Not Detected
1,2-Dichloropropane	4.7	Not Detected	22	Not Detected
1,4-Dioxane	19	Not Detected	68	Not Detected
Bromodichloromethane	4.7	Not Detected	32	Not Detected
cis-1,3-Dichloropropene	4.7	Not Detected	[illegible]	Not Detected
4-Methyl-2-pentanone	4.7	Not Detected	[illegible]	Not Detected
Toluene	4.7	3.4 J	18	13 J
trans-1,3-Dichloropropene	4.7	Not Detected	[illegible]	Not Detected
1,1,2-Trichloroethane	4.7	Not Detected	[illegible]	Not Detected
Tetrachloroethene	4.7	Not Detected	[illegible]	Not Detected
2-Hexanone	19	Not Detected	78	Not Detected

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Client Sample ID: B42-1SSV013116

Lab ID#: 1602064B-16A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020812**	**Date of Collection:**	**1/31/16 4:40:00 PM**
Dil. Factor:	**9.48**	**Date of Analysis:**	**2/8/16 04:28 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	4.7	Not Detected	40	Not Detected
1,2-Dibromoethane (EDB)	4.7	Not Detected	36	Not Detected
Chlorobenzene	4.7	Not Detected	22	Not Detected
Ethyl Benzene	4.7	2.6 J	20	11 J
m,p-Xylene	4.7	5.1	20	22
o-Xylene	4.7	2.8 J	20	12 J
Styrene	4.7	0.90 J	20	3.8 J
Bromoform	4.7	Not Detected	49	Not Detected
Cumene	4.7	Not Detected	23	Not Detected
1,1,2,2-Tetrachloroethane	4.7	Not Detected	32	Not Detected
Propylbenzene	4.7	0.70 J	23	3.4 J
4-Ethyltoluene	4.7	1.3 J	23	6.5 J
1,3,5-Trimethylbenzene	4.7	Not Detected	23	Not Detected
1,2,4-Trimethylbenzene	4.7	Not Detected	23	Not Detected
1,3-Dichlorobenzene	4.7	7.7	28	46
1,4-Dichlorobenzene	4.7	Not Detected	28	Not Detected
alpha-Chlorotoluene	4.7	Not Detected	24	Not Detected
1,2-Dichlorobenzene	4.7	Not Detected	28	Not Detected
1,2,4-Trichlorobenzene	19	Not Detected	140	Not Detected
Hexachlorobutadiene	19	Not Detected	200	Not Detected
Naphthalene	9.5	Not Detected	50	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: B42-2SSV013116

Lab ID#: 1602064B-17A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020811**	**Date of Collection:**	**1/31/16 4:06:00 PM**
Dil. Factor:	**2.26**	**Date of Analysis:**	**2/8/16 04:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.60 J	5.6	3.0 J
Freon 114	1.1	Not Detected	7.9	Not Detected
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	11	Not Detected	44	Not Detected
Chloroethane	4.5	Not Detected	12	Not Detected
Freon 11	1.1	Not Detected	6.3	Not Detected
Ethanol	4.5	50	8.5	94
Freon 113	1.1	Not Detected	8.7	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	11	9.3 J	27	22 J
2-Propanol	4.5	4.9	11	12
Carbon Disulfide	4.5	1.2 J	14	3.6 J
3-Chloropropene	4.5	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	39	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	4.1	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	Not Detected	4.0	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	1.3 J	13	3.9 J
cis-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Tetrahydrofuran	1.1	3.9	3.3	12
Chloroform	1.1	Not Detected	5.5	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Cyclohexane	1.1	Not Detected	3.9	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.1	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.3	Not Detected
Benzene	1.1	Not Detected	3.6	Not Detected
1,2-Dichloroethane	1.1	Not Detected	4.6	Not Detected
Heptane	1.1	0.73 J	4.6	3.0 J
Trichloroethene	1.1	Not Detected	6.1	Not Detected
1,2-Dichloropropane	1.1	Not Detected	5.2	Not Detected
1,4-Dioxane	4.5	Not Detected	16	Not Detected
Bromodichloromethane	1.1	Not Detected	7.6	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.1	Not Detected
4-Methyl-2-pentanone	1.1	Not Detected	[illegible]	Not Detected
Toluene	1.1	0.37 J	[illegible]	1.4 J
trans-1,3-Dichloropropene	1.1	Not Detected	5.	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	[illegible]	Not Detected
Tetrachloroethene	1.1	Not Detected	7.7	Not Detected
2-Hexanone	4.5	Not Detected	18	Not Detected

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Client Sample ID: B42-2SSV013116

Lab ID#: 1602064B-17A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020811**	**Date of Collection:**	**1/31/16 4:06:00 PM**
Dil. Factor:	**2.26**	**Date of Analysis:**	**2/8/16 04:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.1	Not Detected	9.6	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.7	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
Ethyl Benzene	1.1	Not Detected	4.9	Not Detected
m,p-Xylene	1.1	Not Detected	4.9	Not Detected
o-Xylene	1.1	Not Detected	4.9	Not Detected
Styrene	1.1	Not Detected	4.8	Not Detected
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.8	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,3-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,4-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.8	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,2,4-Trichlorobenzene	4.5	Not Detected	34	Not Detected
Hexachlorobutadiene	4.5	Not Detected	48	Not Detected
Naphthalene	2.3	Not Detected	12	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: B42-3SSV013116

Lab ID#: 1602064B-18A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p020810	Date of Collection:	1/31/16 4:24:00 PM
Dil. Factor:	2.27	Date of Analysis:	2/8/16 03:37 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.1	0.61 J	5.6	3.0 J
Freon 114	1.1	Not Detected	7.9	Not Detected
Chloromethane	11	Not Detected	23	Not Detected
Vinyl Chloride	1.1	Not Detected	2.9	Not Detected
1,3-Butadiene	1.1	Not Detected	2.5	Not Detected
Bromomethane	11	Not Detected	44	Not Detected
Chloroethane	4.5	Not Detected	12	Not Detected
Freon 11	1.1	0.25 J	6.4	1.4 J
Ethanol	4.5	150	8.6	290
Freon 113	1.1	Not Detected	8.7	Not Detected
1,1-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Acetone	11	8.3 J	27	20 J
2-Propanol	4.5	120	11	290
Carbon Disulfide	4.5	Not Detected	14	Not Detected
3-Chloropropene	4.5	Not Detected	14	Not Detected
Methylene Chloride	11	Not Detected	39	Not Detected
Methyl tert-butyl ether	1.1	Not Detected	4.1	Not Detected
trans-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Hexane	1.1	Not Detected	4.0	Not Detected
1,1-Dichloroethane	1.1	Not Detected	4.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.5	2.1 J	13	6.3 J
cis-1,2-Dichloroethene	1.1	Not Detected	4.5	Not Detected
Tetrahydrofuran	1.1	1.7	3.3	4.9
Chloroform	1.1	Not Detected	5.5	Not Detected
1,1,1-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Cyclohexane	1.1	Not Detected	3.9	Not Detected
Carbon Tetrachloride	1.1	Not Detected	7.1	Not Detected
2,2,4-Trimethylpentane	1.1	0.22 J	5.3	1.0 J
Benzene	1.1	Not Detected	3.6	Not Detected
1,2-Dichloroethane	1.1	Not Detected	4.6	Not Detected
Heptane	1.1	0.61 J	4.6	2.5 J
Trichloroethene	1.1	Not Detected	6.1	Not Detected
1,2-Dichloropropane	1.1	Not Detected	5.2	Not Detected
1,4-Dioxane	4.5	Not Detected	16	Not Detected
Bromodichloromethane	1.1	Not Detected	7.6	Not Detected
cis-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
4-Methyl-2-pentanone	1.1	Not Detected	4.6	Not Detected
Toluene	1.1	0.74 J	4.2	2.8 J
trans-1,3-Dichloropropene	1.1	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.1	Not Detected	6.2	Not Detected
Tetrachloroethene	1.1	Not Detected	7.7	Not Detected
2-Hexanone	4.5	Not Detected	18	Not Detected

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Client Sample ID: B42-3SSV013116

Lab ID#: 1602064B-18A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p020810**	**Date of Collection:**	**1/31/16 4:24:00 PM**
Dil. Factor:	**2.27**	**Date of Analysis:**	**2/8/16 03:37 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.1	Not Detected	9.7	Not Detected
1,2-Dibromoethane (EDB)	1.1	Not Detected	8.7	Not Detected
Chlorobenzene	1.1	Not Detected	5.2	Not Detected
Ethyl Benzene	1.1	Not Detected	4.9	Not Detected
m,p-Xylene	1.1	0.67 J	4.9	2.9 J
o-Xylene	1.1	0.29 J	4.9	1.2 J
Styrene	1.1	Not Detected	4.8	Not Detected
Bromoform	1.1	Not Detected	12	Not Detected
Cumene	1.1	Not Detected	5.6	Not Detected
1,1,2,2-Tetrachloroethane	1.1	Not Detected	7.8	Not Detected
Propylbenzene	1.1	Not Detected	5.6	Not Detected
4-Ethyltoluene	1.1	Not Detected	5.6	Not Detected
1,3,5-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,2,4-Trimethylbenzene	1.1	Not Detected	5.6	Not Detected
1,3-Dichlorobenzene	1.1	0.64 J	6.8	3.8 J
1,4-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
alpha-Chlorotoluene	1.1	Not Detected	5.9	Not Detected
1,2-Dichlorobenzene	1.1	Not Detected	6.8	Not Detected
1,2,4-Trichlorobenzene	4.5	Not Detected	34	Not Detected
Hexachlorobutadiene	4.5	Not Detected	48	Not Detected
Naphthalene	2.3	Not Detected	12	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	95	70-130

DATA REVIEW WORKSHEETS

Project Number:__1602064B_____
Date:_____01/31/2016_____

REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: QC criteria from "Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999"; USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) _Eurofins_-_Air_Toxics_____ data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: __1602064B_____ Sample matrix: ___Air_____
No. of Samples: _____8_____

Trip blank No.: ____-_____
Field blank No.: _____-_____
Equipment blank No.:___-_____
Field duplicate No.:_____-_____

___X___ Data Completeness
___X___ Holding Times
___X___ GC/MS Tuning
___X___ Internal Standard Performance
___X___ Blanks
___X___ Surrogate Recoveries
___N/A_ Matrix Spike/Matrix Spike Duplicate
___X___ Laboratory Control Spikes
___X___ Field Duplicates
___X___ Calibrations
___X___ Compound Identifications
___X___ Compound Quantitation
___X___ Quantitation Limits

Overall Comments:_VOCs_by_method_TO-15_(full suite)_____
_____

Definition of Qualifiers:
J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer: Rafael Infante
Date:__ 02/27/2016_____

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

All criteria were met _X_
Criteria were not met
and/or see below ____

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 7 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): N/A – summa canisters

Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).
If the % solids of soil samples is 10-50%, estimates positive results (J) and nondetects (UJ)
If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).
If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).
If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).
If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).
If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

All criteria were met __X__
Criteria were not met see below ____

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

__X___ The BFB performance results were reviewed and found to be within the specified criteria.

__X___ BFB tuning was performed for every 24 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected: _____

If mass calibration is in error, all associated data are rejected.

All criteria were met _____
Criteria were not met
and/or see below ___X___

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____02/12/16_____
Dates of continuing calibration:__02/12/16;_02/15/16___
Instrument ID numbers:____MSD-14_____
Matrix/Level:_____Air/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibration met the method performance criteria except for the following:				
02/15/2016	1602064B-20B	33 %	1,2,4-Trichlorobenzene	1602064B-11A

Note: Sample results qualified as estimated (J) in affected samples.

Criteria

All RFs must be > 0.05 regardless of method requirements for SPCC.
All %RSD must be ≤ 15 % regardless of method requirements for CCC.
All %Ds must be ≤ 30% regardless of method requirements for CCC.
Method TO-15 does not specify criterion for the curve correlation coefficient (r). A limit for r of ≥ 0.995 has therefore been utilized as professional judgment.

Actions

If any compound has an initial RF or a continuing RF of < 0.05, estimate positive results (J) and reject nondetects (R), regardless of method requirements.
If any compound has a %RSD > 15%, estimate positive results (J) and use professional judgment to qualify nondetects.
If any compound has a %RSD > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and nondetects (UJ).
If any compound has a % D > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has r < 0.995, estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

All criteria were met ___X___
Criteria were not met
and/or see below _____

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION/ UNITS
None_of_the_analyte_detected_in_the_method/laboratory_blank_above_the_reporting_limit/_action_level_for_blanks.				

Summa_canisters_met_cleaning_certification_criteria

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No_field/trip/equipment_blanks_analyzed_with_this_data_package.				

All criteria were met __X__
Criteria were not met
and/or see below _____

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)
ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and ≤ AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but ≤ AL, report the compound as not detected (U) at the reported concentration.
If the concentration is ≥ SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

All criteria were met __X__
Criteria were not met
and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND			ACTION
	1,2-DICHLOROETHANE-d4	Toluene-d8	4-BFB	

_Surrogate_recoveries_within_laboratory_control_limits_____
_____
_____
_____
_____
_____

QC Limits* (Air)

_____LL_to_UL___70__to_130__ _70__to_130_ _70__to_130__

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.

All criteria were met _____
Criteria were not met
and/or see below __N/A____

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.
Sample ID:_____ Matrix/Level:_____

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
_____MS/MSD_are_not_required_as_part_of_Method_TO-15;_blank_spike_used_to_assess_____accuracy_____					

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).
If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).
If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

All criteria were met ____
Criteria were not met
and/or see below __N/A__

VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD – Unspiked Compounds

It should be noted that Method TO-15 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID:_____ Matrix/Level/Unit:_____

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION

Actions:

* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).
* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

All criteria were met __X___
Criteria were not met
and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? Yes or No. If no make note in data review memo.
List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT

___LCS/LCSD_%_recoveries_and_RPD_within_laboratory_control_limits_____
_____
_____
_____
_____
_____

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

All criteria were met _X___
Criteria were not met
and/or see below _____

IX. LABORATORY DUPLICATE PRECISION

Sample IDs: __LCS/LCSD_(02/08/2016)___ Matrix:___Air____
Sample IDs: __LCS/LCSD_(02/15/2016)___ Matrix:___Air____

Laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.
Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
RPD within laboratory and generally acceptable control limits.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met ___X___
Criteria were not met
and/or see below _____

IX. FIELD DUPLICATE PRECISION

Sample IDs: _____-_____ Matrix:___Air____

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No field duplicate collected with this data package; LCS/LCSD results used to assess precision. RPD within laboratory and generally acceptable control limits. Field duplicate for the project included in data package SDG 1602024A.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met __X__
Criteria were not met
and/or see below _____

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

* Area of +40% or -40% of the IS area in the associated calibration standard.
* Retention time (RT) within ± 0.06 seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

_Internal_standard_area_and_retention_times_within_laboratory_control_limits_for_both_samples_and_calibration_standards_____

Actions:

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -40%		IS AREA > + 40%
Positive results	J		J
Nondetected results	R		ACCEPT

2. If a IS retention time varies more than 0.330 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

All criteria were met __X__
Criteria were not met
and/or see below ____

XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

1602064B-11A

m- + p-xylene RF = 0.80210

[ ] = (507406)(400)/(460847)(0.80210)

= 549.073 ppbv OK

All criteria were met __X__
Criteria were not met
and/or see below _____

XII. QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASONS FOR DILUTION
1602024B-11A	796 X	Analytes above calibration range
1602024B-14A	17 X	Analytes above calibration range
1602024B-16A	9.48 X	Analytes above calibration range
All samples were diluted by a factor of < 2.51x.		

B. Percent Solids

List samples which have ≤ 50 % solids

Actions:

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)